Work Order ID 69298

Friday, May 06, 2011 3:48:31 PM

Item ID: D412-664-203 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/3/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** MF **Date:** 1-05-06 **Tooling:** **Date:** **Run Start**

QC: **Date:** **SPC (Y/N):** **Date:** **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D412-664-243	E								
100	DOCUMENT CONTROL	0.00							
DC	**Memo**	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D412-664-203 ~~CHG 006~~ CHG007								
110	Packaging	0.00							
Packaging	**Memo**	0.00							
Packaging									
120	BENDING MACHINE - CROSSTUBES	0.00							
CNC Bend 2	**Memo**	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010								

DJ for BG 11-5-24

11-5-9

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector	
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				

NOTE: Date & initial all entries

Work Order ID 69298

Friday, May 06, 2011 3:48:32 PM

Item ID: D412-664-203 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/3/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00				(1)			
QC	**Memo**	0.00							
Quality Control									
140		0.00				(1)			
Crosstubes	Crosstubes								
Crosstubes	**Memo**	0.00							

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551and drill table DT8577 using #9 holes as per QSI 10 to install towers.

2-Ream hole to finish size in tube as per Dwg D412-664-243using drill Jig DT8550 & DT8551.Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # & BATCH #

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

8 11/05/11

JW 11-05-12
SAD
11-05-12

JW 11-05-12

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

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Item ID: D412-664-203 **Accept** **Setup Start** **Stop**
Revision ID:
Item Name: Crosstube Aft
Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**
Required Date: 6/3/2011 **Req'd Qty:** 1.00 **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Run Start **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 HandFXtube	Crosstubes Chemical Conversion	0.00							
Hand Finishing Crosstubes	**Memo**	0.00 SAD 11-05-12				(1)			
160 QC	QC3- Inspect Part Finish	0.00							
Quality Control	**Memo**	0.00 S 11/05/13							
170 QC	QC5- Inspect part completeness to step on W/O	0.00							
Quality Control	**Memo**	0.00 S 11/05/13				(1)			

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 69298

Friday, May 06, 2011 3:48:32 PM

Item ID: D412-664-203 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/3/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00				CL 11/05/13 (1)			
Outsource2	**Memo**	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038Or Issue P/O: 14084 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190		0.00							
Packaging	Packaging								
Packaging	**Memo**	0.00							
Packaging	Inspect for transit damage Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								

11/05/13 (1)

11/05/13 (1)

AT 11-05-13

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				

NOTE: Date & initial all entries

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Work Order ID 69298

Friday, May 06, 2011 3:48:32 PM

Item ID: D412-664-203 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 6/3/2011 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
SprayPaint									
Spray Painting	**Memo**	0.00							
	1-Prime inside and outside crosstube as per QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per DEO D412-664-243 and QSI 005 4.2								
	PRIME: Start Time:_____ Fininsh Time:_____ PAINT: Start Time:_____ Finish Time:_____								
220	QC14- Inspect Spray Paint	0.00							
QC									
Quality Control	**Memo**	0.00							
	Then,Wrap in plastic bag to protect from scratches								

11-05-14 BT 11-05-17

11-05-13 11-05-16

11-05-14 11-05-17

Paint as per DEO 412-664-243-E-1

BT 11-05-18

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W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Item ID: D412-664-203 **Accept** **Setup Start**
Revision ID: **Stop**
Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**
Required Date: 6/3/2011 **Req'd Qty:** 1.00 **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
Crosstubes	Crosstubes					BT	11-05-20		(X1)
Crosstubes	**Memo**	0.00							

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install support with magnobond as per QSI 015 Adhere for for 12 Hrs
A/R 6398 Magnobond Batch: 116677
Expiry Date: 11-08

3-Install chafing shield and clamps as per DEO D412-664-243 using installaition jig DT9024 Torque clamps to 80-100 in lb.

A/R Proseal batch: 117510

240	QC5- Inspect part completeness to step on W/O	0.00							
QC						(H)			
Quality Control	**Memo**	0.00							

S 11/05/24

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W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector	
		Envi Pt A hABel						

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 69298

Friday, May 06, 2011 3:48:32 PM

Item ID: D412-664-203 **Accept** **Setup Start** **Stop**

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Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**

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Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250 Packaging Packaging	Pick Kit	0.00				11			
	Memo	0.00							
260 QC Quality Control	QC4- 100% Inspect kits for completeness	0.00				0			
	Memo	0.00							
270 Packaging Packaging	Packaging	0.00				11/5/24			
	Memo	0.00							

Identify and pack for shipping as per PPP D412-664-203
******Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date *******
Time & date of packaging:_____ REV I-
Location:_____

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W/O:		WORK ORDER CHANGES						
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Item Name: Crosstube Aft

Start Date: 5/9/2011 **Start Qty:** 1.00 **Cust Item ID:**

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Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00						11/6/25	
QC	**Memo**	0.00							
Quality Control									

MF
11-05-24

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

Friday, May 06, 2011 3:48:26 PM

Work Order ID: 69298

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 5/9/2011 **Required Date:** 6/3/2011

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:E□04.02.16□Reformat; Added D3189-1□K/DS
IPP Rev:F 06-03-29 Remove Coments on Pick List JLM
IPP Rev:G 06.12.08 per ECN 886 EC
IPP Rev:H 07-04-30 As per Rev D JLM
IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev G 11.04.21 DEO D412-664-243-E-1 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
AN6-40A Bolt		Purchased	No			250	Each	114.0000	4	4	M117366		

Location	Loc Qty	Loc Code
ST340	80	
117366	80	
ST343	34	
115905	14	
116549	20	

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
AN6-41A Bolt		Purchased	No			250	Each	67.0000	2	2	M117688		

Location	Loc Qty	Loc Code
ST344	67	
115316	17	
117366	50	

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
AN960JD616 Washer	NAS1149D0663J	Purchased	No			250	Each	0.0000	18	18	M11709 1°	11/5/2	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID: 69298

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 5/9/2011 **Required Date:** 6/3/2011

Start Qty: 1.00 **Required Qty:** 1.00

D2896-1	Manufactured	No		230	Each	21.0000	1	1

Support

RT 11-05-20

Location	Loc Qty	Loc Code	
LG052	21		
58356	3		
67742	18		x1

D3189-1	Manufactured	No		230	Each	24.0000	2	2

Chafing Shield

RT 11.05-20

Location	Loc Qty	Loc Code	
FG	4		
36065	4		
LG053	20		
63982	16		x2
67587	4		

D3595-063-570	Manufactured	No		230	Each	35.0000	2	2

RUBBER CUSHION

RT 11 05 -20

Location	Loc Qty	Loc Code	
FG	13		
37971	1		
42243	12		
LG055	22		
42243	1		
63406	21		x2

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
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* H:\FORMS\Quality Assurance\approved QA\NCRWO RevE

Picklist Print

Friday, May 06, 2011 3:48:26 PM

Work Order ID: 69298

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Start Date: 5/9/2011 **Required Date:** 6/3/2011

Start Qty: 1.00 **Required Qty:** 1.00

D412-664-203TRN Crosstube Turning Detail	Manufactured	No		110	Each	1.0000	1	1

B69251

Location		Loc Qty	Loc Code
LG003		1	
	67272	1	

MS21042L6 Nut	Purchased	No		250	Each	322.0000	6	6

Location		Loc Qty	Loc Code
ST300		322	
	116548	22	
	117343	300	

MS21920-28 Clamp(per MIL-DTL-8783C)	Purchased	No		230	Each	74.0000	4	4

117344

Location		Loc Qty	Loc Code
FG		5	
	105884	5	
LG050		69	
	116839	19	
	117344	50	

MS21920-30 clamp(per MIL-DTL-8783C)	Purchased	No		230	Each	70.0000	2	2

Location		Loc Qty	Loc Code
LG050		20	
	109181	20	
LG051		50	
	111258	50	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item	Qty -243	Part Number	Description
1	X	**D412-664-243**	**CROSSTUBE ASSEMBLY (412 HIGH AFT)**
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6009-129
 FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED.
5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.
10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

69298

DEO ATTACHED

RELEASED
2009 -10- 29

REV.	DESCRIPTION	BY	DATE
E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17

DESIGN	PH	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 1 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		

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Dart Aerospace Ltd

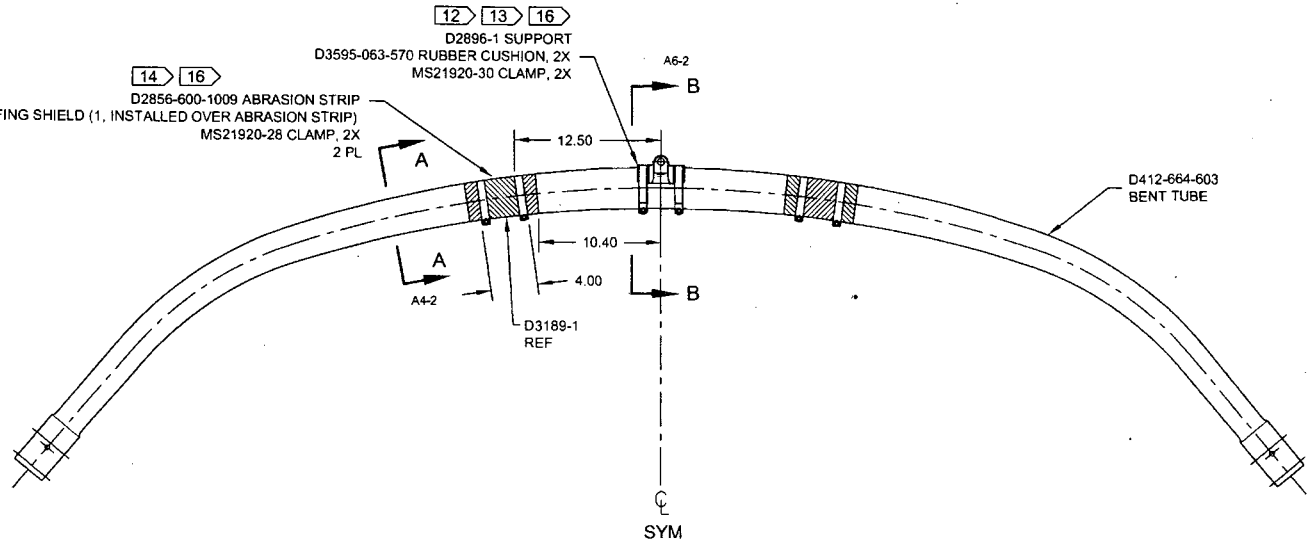
W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B **Initial** Chief Eng	**Action Description** Chief Eng	**Sign & Date**	**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector

NOTE: Date & initial all entries

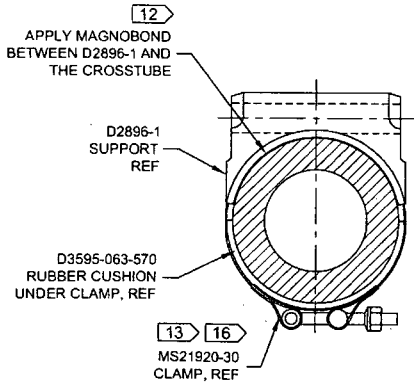


D212-664-243
ASSEMBLY DETAIL E

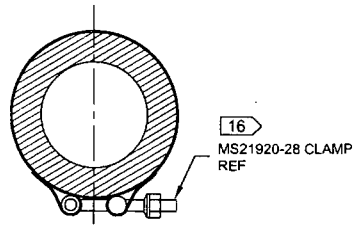
#69298

DEO ATTACHED

RELEASED
2009 -10- 29



SECTION B-B D4-2
SCALE 4X



SECTION A-A C6-2
SCALE 4X

DESIGN	PH	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. REV. E
MFG. APPR.		D412-664-243 SHEET 2 OF 4
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT) NTS
DATE 09.09.30		

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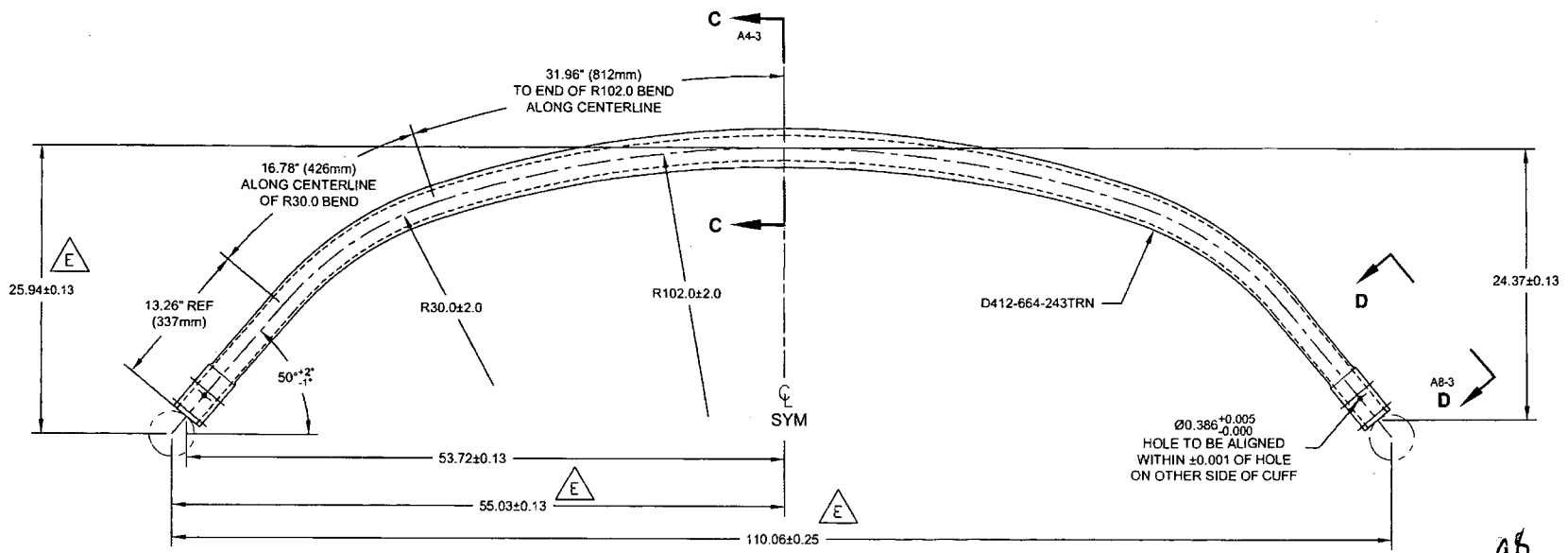
W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

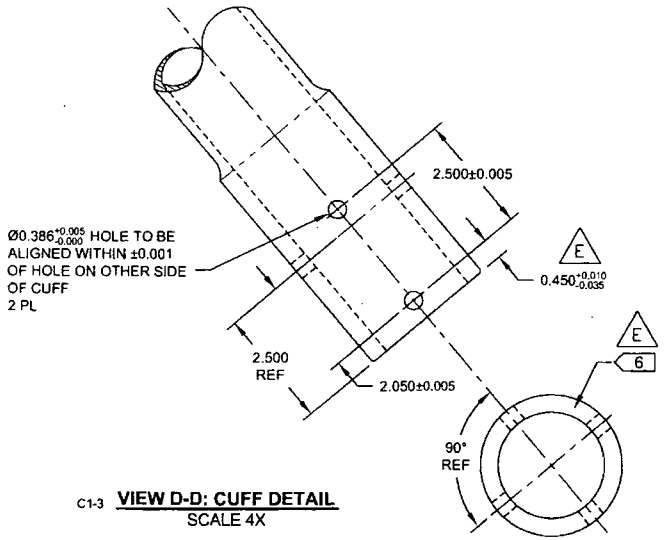
NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B				**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng		**Sign & Date**			

NOTE: Date & initial all entries

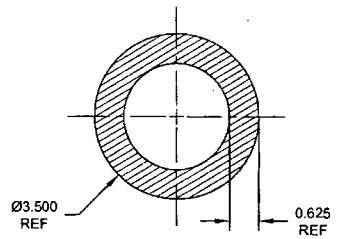


D412-664-603 10
BENDING AND DRILLING DETAIL E

#64896



C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X



SECTION C-C D5-3
SCALE 4X

DEO ATTACHED

RELEASED
2009 -10- 29
MP

DESIGN	PH	**DART AEROSPACE LTD**
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. E
MFG. APPR.		D412-664-243 SHEET 3 OF 4
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT) NTS
DATE 09.09.30		

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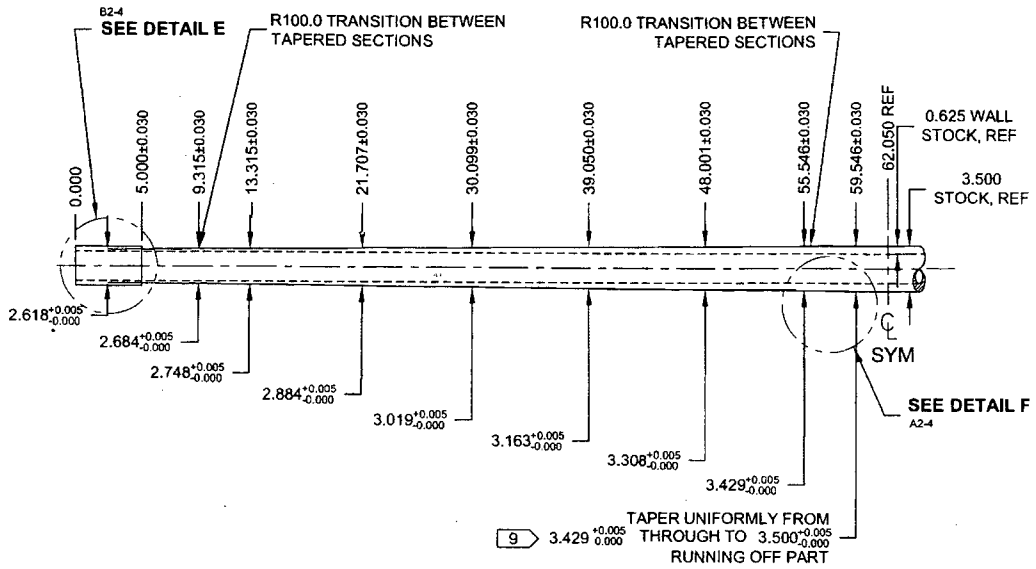
W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

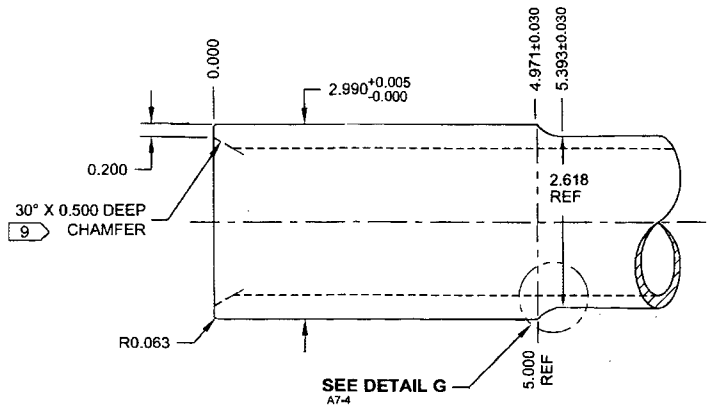
Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				

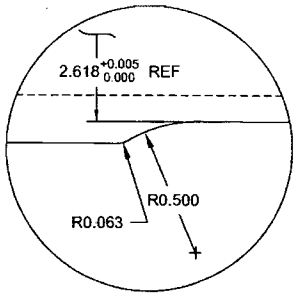
NOTE: Date & initial all entries



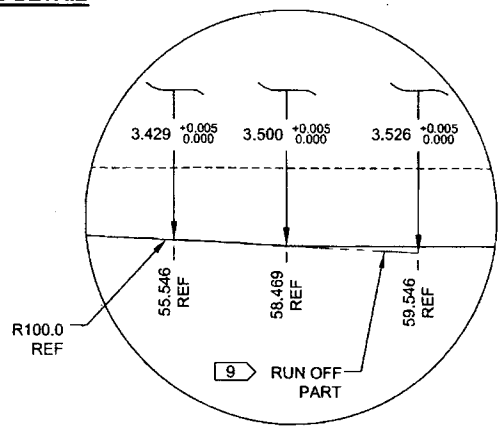


DETAIL E:
CROSSTUBE CUFF D8-4
SCALE 5X

D412-664-243TRN TURNING DETAIL (E)



DETAIL G:
CUFF TRANSITION C2-4
SCALE 10X



DETAIL F:
TAPER RUN-OFF C4-4
NOT TO SCALE

#69298

DEO ATTACHED

RELEASED
2009 -10- 29

DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D412-664-243	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	09.09.30		

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W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				

NOTE: Date & initial all entries

DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSEMBLY (412 HI AFT)		ENGINEERING ORDER	D412-664-243-E-1	SHEET 1 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.03.31	DATE 11/03.31	DATE 11.03.31	DATE 11/03.31	DATE 11.03.31

PURPOSE:
REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -243	Part Number	Description
6	0	D2856-600-1009	ABRASION STRIP

WAS:

6	2	D2856-600-1009	ABRASION STRIP

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA

14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.

#69298

RELEASED
2011-04-07

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W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector	
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				

NOTE: Date & initial all entries

DRAWING NO.	TITLE	REV. E	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D412-664-243	CROSSTUBE ASSEMBLY (412 HI AFT)		ENGINEERING ORDER	D412-664-243-E-1	SHEET 2 OF 2	NTS

DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.
DATE 11.03.31	DATE 11.03.31	DATE 11-03-31	DATE 11.03.31	DATE 11.03.31

IS:

16 14

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)
MS21920-28 CLAMP, 2X
2 PL

D412-664-603
BENT TUBE

2.00
1.00

WAS:

14 16

D2856-600-1009 ABRASION STRIP
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)
MS21920-28 CLAMP, 2X
2 PL

D3189-1
REF

#69298.

RELEASED
2011-04-07

D412-664-243
ASSEMBLY DETAIL

2

MASK AREA PRIOR TO PAINTING AND
APPLY CLEAR COAT AFTER PAINTING

2.00

℄
SYM

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W/O:		WORK ORDER CHANGES						
DATE	**STEP**	**PROCEDURE CHANGE**		**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

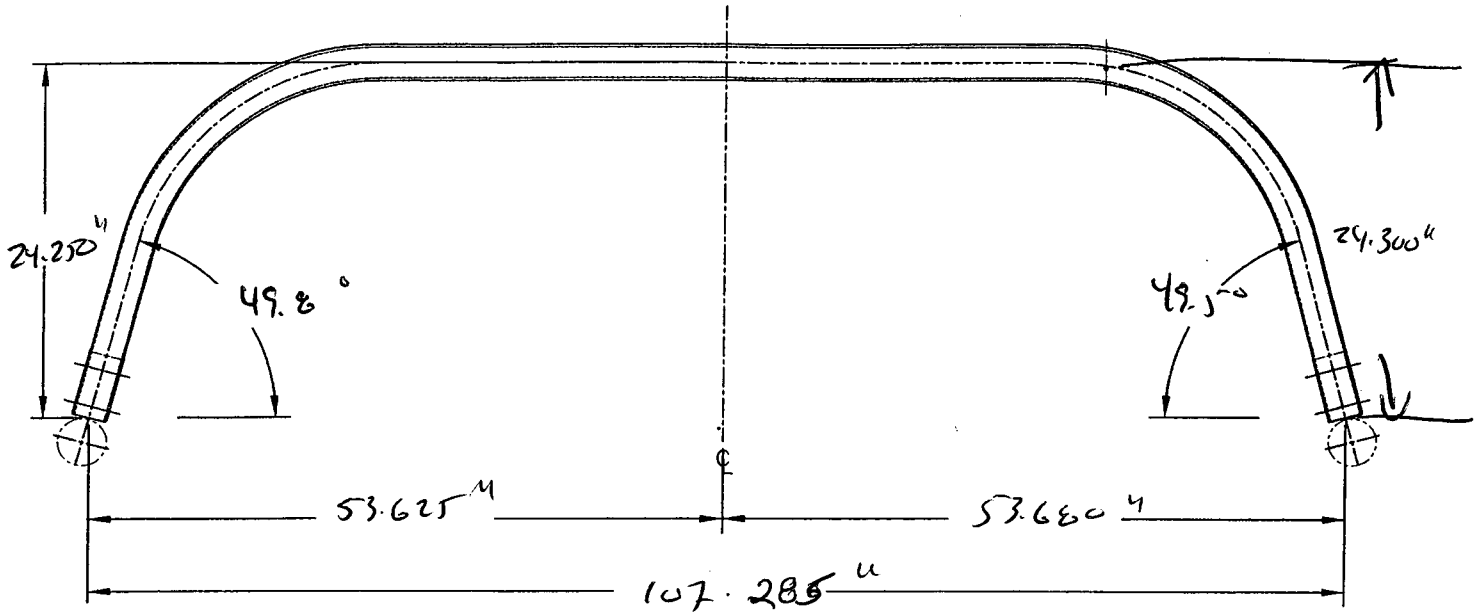
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector	
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**				

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	69298
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 **Rev:** E		Page 1 of 1

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	
Date	11-07-14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	

Dart Aerospace Ltd

WORK ORDER CHANGES

W/O:

DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

WORK ORDER NON-CONFORMANCE (NCR)

NCR:

DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

LIQUID PENETRANT TEST REPORT

P- 05608

ACUREN

PAGE 1 OF 1

CLIENT: DART AEROSPACE — DATE: MAY-13-2011 — TIME: AM ☑ PM ☐

ATTENTION: LINDA LACELLE/CHANTALE LIAN — ACUREN JOB NO.: 183-11-02126

ADDRESS: 1270, ABERDEEN RD HAWKESBURY, ON — PO/WO NO.: 14084

WORK LOCATION: AS ADDRESS

ACCEPTANCE STD.: ASTM 1417/CSI-033 — REV./DATE: 2005

PROJECT: WET FLUORESCENT LIQUID PENETRANT INSPECTION ON 6 X "C-ROSSTUBES"

ITEM(S) EXAMINED: — SEE BELOW —

JOB DESCRIPTION

PROCEDURE NO. LT-003 REV./DATE 2008 — TECHNIQUE NO. LT-003 REV./DATE 2008

PART NO. — MATERIAL ALODINE - ALUMINUM — THICKNESS N/A

SCOPE: PERFORMED A WET-FLUO L.P.I. ON 100% ON THE EXTERNAL SURFACE ON 6 X "C-ROSSTUBES"

TEST DETAILS

METHOD	☑ FLUORESCENT	☐ VISIBLE	☑ WATER WASH	☐ SOLVENT REMOVABLE	☐ POST EMULSIFIED
FAMILY BRAND	MAGNAFLUX		BLACK LIGHT S/N 13798	☐ OUTPUT > 1000 μW/CM²	☑ AMBIENT < 2 fc
PENETRANT	ZL-67	MINIMUM DWELL TIME 10 MIN.	LIGHTING EQUIP.	☐ FLASHLIGHT ☐ TROUBLELIGHT	☐ OUTPUT>100 fc @ SURFACE
PENETRANT REMOVER	H_2O	MINIMUM DRY TIME >10 MIN.	OTHER		
DEVELOPER	SKD-S2	MINIMUM DWELL TIME 10 MIN.	LIGHT METER S/N		CAL DUE DATE Aug/Sept/2011
DEVELOPER TYPE	☑ NON AQUEOUS	☐ AQUEOUS ☐ DRY			

TEST SURFACE

SURFACE CONDITION	☐ AS GROUND	☐ AS WELDED	☐ MACHINED	☐ SHOT BLASTED	☑ CLEAN BARE METAL
SURFACE TEMPERATURE	☐ < - 4°C/ 20°F	☐ - 4°C/ 20°F TO 10°C/50°F		☑ 10°C/50°F TO 52°C/125°F	☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

ITEM	COMMENTS	ACCEPT	REJECT	
1	CROSSTUBE W.O. ID 69298	✓		D412-664-203 AFT
2	W.O. ID 69299	✓		D412-664-203 AFT
3	W.O. ID 69355	✓		D412-664-203 AFT
4	W.O. ID 67436	✓		D412-664-203 AFT
5	W.O. ID 67557	✓		D412-664-203 AFT
6	W.O. ID 67560	✓		D412-664-203 AFT

NO RELEVANT INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

JT 11-05-13

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE: Ken Tiffley (PRINT) — (SIGNATURE) — DTR # E44643

TECHNICIAN (SIGNATURE): — REPORT REVIEWED BY:

NAME (PRINT): YVES DESROSIERS (1ST TECHNICIAN) — (2ND TECHNICIAN) — NAME — INITIALS

CGSB LEVEL 2 SNT LEVEL 2 — CGSB LEVEL — SNT LEVEL

CGSB REG. NO 3049 — CGSB REG. NO

WHITE – CLIENT COPY CANARY – OFFICE COPY PINK – TECHNICIAN COPY GOLD – OFFICE COPY